CLAIMS

What is claimed is:

1. A polarization maintaining fiber coupler, comprising:

an input polarization maintaining fiber;

at least two output polarization maintaining fibers;

a multifaceted prism which transmits an input light signal from the input polarization maintaining input fiber to the at least two output polarization maintaining fibers; and

a lens positioned between the prism and theoutput fibers to focus the light signal from the prism.

2. The fiber coupler of claim 1, further comprising a second lens positioned between the input fiber and the prism to collimate the input light signal.

3. The fiber coupler of claim 1 wherein the lens is a GRIN lens.

4. The fiber coupler of claim 1 wherein the prism is coated with an anti-reflection coating.

5. The fiber coupler of claim 4 wherein the coating is a dielectric material.

6. The fiber coupler of claim 1 wherein the prism is made of glass.

7. An low polarization dependent loss coupler, comprising:

a multifaceted prism which couples an input light signal from an input optical fiber to at least two output optical fibers; and

a lens positioned between the prism and the output fibers to

focus the light signal from the prism to the output fibers,

the polarization dependent loss of the coupler being less than about 0.05 dB.

8. The coupler of claim 7, further comprising a second lens positioned between the input fiber and the prism to collimate the input light signal.

9. The coupler of claim 7 wherein the polarization dependent loss of the coupler is less than about 0.01 dB.

10. The coupler of claim 7 wherein the input and the output optical fibers are ordinary fibers.

11. The coupler of claim 7 wherein the collimating lens is a GRIN lens.

12. The coupler of claim 7 wherein the prism is coated with an anti-reflection coating.

13. The coupler of claim 12 wherein the coating is a dielectric material.

14. The coupler of claim 7 wherein the prism is made of glass.

15. An low polarization dependent loss coupler, comprising:

a multifaceted prism which couples an input light signal from an input optical fiber to at least two output optical fibers, an angle of incidence of the light signal with the prism being between about 0 to 10 degrees, and

a lens positioned between the prism and the output fibers to focus the light signal from the prism to the output fibers.

16. The coupler of claim 15, further comprising a second lens positioned between the input fiber and the prism to collimate the input light signal.

17. The coupler of claim 15 wherein the input optical fiber and the output optical fibers are polarization maintaining fibers.

18. The coupler of claim 15 wherein the angle of incidence is less than about 8 degrees.

19. The coupler of claim 15 wherein the collimating lens is a GRIN lens.

20. The coupler of claim 15 wherein the prism is coated with an anti-reflection coating.

21. The coupler of claim 20 wherein the coating is a dielectric material.

22. The coupler of claim 15 wherein the prism is made of glass.

23. A tunable optical coupler, comprising:

a multifaceted prism which couples an input light signal from an input optical fiber to at least two output optical fibers; and

a lens positioned between the prism and the output fibers

to focus the light signal from the prism,

the proportion of the input light signal being transmitted to each of the output optical fibers being tunable.

24. The coupler of claim 23, further comprising a second lens positioned between the input fiber and the prism to collimate the input light signal.

25. The coupler of claim 23 wherein the input optical fiber is a polarization maintaining fiber.

26. The coupler of claim 23 wherein the output optical fibers are polarization maintaining fibers.

27. The coupler of claim 23 wherein the prism is moved in a plane orthogonal to the optical axis of the prism to vary the proportion of the light signal being sent to each output fiber.

28. The coupler of claim 23 wherein the lens is a GRIN lens.

29. The coupler of claim 23 wherein the prism is coated with an anti-reflection coating.

30. The coupler of claim 29 wherein the coating is a dielectric material.

31. The coupler of claim 23 wherein the prism is made of glass.

32. The coupler of claim 23 wherein the coupler has a polarization dependent loss of less than about 0.01 dB.

33. A optical coupler, comprising:

a multifaceted prism which couples an input light signal from an input optical fiber to at least two output optical fibers;

a first lens positioned between the input fiber and the prism to collimate the input light signal from the input fiber; and

a second lens positioned between the prism and the at least two output fibers to focus the light signal from the prism,

the polarization dependent loss of the coupler being less than about 0.05 dB, and the prism being movable in a plane orthogonal to the optical axis of the prism to vary the proportion of the light signal being sent to each output fiber.

34. A telecommunications system, comprising:

an attenuator which compensates for polarization dependent losses in an optical fiber network;

an input optical transmission line which transmits signals to the attenuator; and

an output optical transmission line that transmits signals from the attenuator;

the input transmission line including a polarization scrambler which randomly changes the polarization state of an input optical signal, the output transmission line including a coupler that couples optical signals from an input optical fiber to two output optical fibers, one of the two output optical fibers being a tap line of the output transmission line that is fed to a control circuit which provides feedback signals to the attenuator, the coupler including a multifaceted prism which receives the input light signal from the input optical fiber and directs a first portion of the light signal to one of the two output optical fibers and a remaining portion of the light signal to the other output optical fiber, and a lens which focuses the light signal from the prism to the output optical fibers.

35. The telecommunications system of claim 34, further comprising a photodetector coupled to the tap line, the photodetector receiving optical signals from the coupler and sending electrical signals to the control circuit.

36. The telecommunications system of claim 34 wherein the coupler includes a second lens which collimates the light signal from the input optical fiber.

37. The telecommunications system of claim 34 wherein the first portion of the light signal is at least 90% of the light signal.

38. The telecommunications system of claim 37 wherein the first portion of the light signal is about 95% of the light signal.

39. The telecommunications system of claim 34 wherein the prism is coated with an anti-reflection coating.

40. The telecommunications system of claim 39 wherein the coating is a dielectric material.

41. The telecommunications system of claim 34 wherein the prism is made of glass.

42. A method of maintaining the polarization in a fiber coupler, comprising:

transmitting an input light signal through an input polarization maintaining fiber to a multifaceted prism; and

focusing selective proportions of the light signal from the prism to at least two respective polarization maintaining output fibers to couple the input light signal to the output optical fibers.

43. The method of claim 42, further comprising collimating the input light signal to the prism.

44. A method of coupling a light signal, comprising:

transmitting a light signal from an input optical fiber to a multifaceted prism; and

focusing selective proportions of the light signal from the prism to at least two respective polarization maintaining output fibers to couple the input light signal to the output optical fibers,

the coupling of the light signal having a polarization dependent loss of less than about 0.05 dB.

45. The method of claim 44, further comprising collimating the input light signal to the prism.

46. The method of claim 44 wherein the coupling has a polarization dependent loss of less than about 0.01 dB.

47. A method of coupling a light signal, comprising:

transmitting a light signal from an input optical fiber to a multifaceted prism; and

focusing selective proportions of the light signal from the prism to at least two respective polarization maintaining output fibers to couple the input light signal to the output optical fibers,

an angle of incidence of the light signal with the prism being between about 0 to 10 degrees.

48. The method of claim 47 wherein the angle of incidence is less than about 8 degrees.

49. The method of claim 47, further comprising collimating the input light signal.

50. A method of coupling a light signal, comprising:

transmitting a light signal from an input optical fiber to a multifaceted prism; and

focusing selective proportions of the light signal from the prism to at least two respective polarization maintaining output fibers to couple the input light signal to the output optical fibers,

the proportion of the input light signal being coupled to each of the output optical fibers being tunable.

51. The method of claim 50, further comprising collimating the input light signal.

52. The method of claim 50, further comprising moving the prism in a plane orthogonal to the optical axis of the prism to vary the proportion of the light signal being sent to each output fiber.

53. A method of coupling a light signal, comprising:

collimating an input light signal from an input optical fiber;

transmitting the collimated light signal from to a multifaceted prism; and

focusing selective proportions of the light signal from the prism to at least two respective polarization maintaining output fibers to couple the input light signal to the output optical fibers; and

moving the prism in a plane orthogonal to the optical axis of the prism to vary the proportion of the light signal being sent to each output fiber,

the polarization dependent loss of the coupling being less than about 0.05 dB.

54. A method of compensating polarization dependent loss in a telecommunications system, comprising:

randomly changing the polarization states of an optical signal and then sending the light signal to an attenuator;

compensating for polarization dependent loss of the optical signal with the attenuator;

transmitting an input light signal from the attenuator to a coupler of an output transmission line; and

coupling the input light signal to two output optical fibers, one of the two output optical fibers being a tap line of the output transmission line that is fed to a control circuit which provides feedback signals to the attenuator, the tap line of the output transmission line providing sampling of the power of each polarization state to determine how much polarization dependent loss exists in the transmission line,

the coupling including transmitting the input light signal to a multifaceted prism, the prism directing a first portion of the light signal to one of the two output optical fibers and a remaining portion of the light signal to the other output optical fiber, and focusing the light signal from the prism to the output optical fibers.

55. The method of claim 54, further comprising collimating the optical signal to the prism.

56. The method of claim 54 wherein the first portion of the light signal is at least 90% of the light signal.

57. The method of claim 56 wherein the first portion of the light signal is about 95% of the light signal.